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16. Abstract  Navigation buoys have been used in the United States since 1767 to warn mariners of impending dangers. It is rather odd, therefore, that some 200 years later there is no collection of material in one place that might shed some light upon buoy technology. Undoubtedly, the state-of-the-art is much more sophisticated, and it is the intention of this paper to present a buoy reference library. The library consists of all known books and unclassified papers that were possible to obtain in a four-week period. The subjects of both fixed and floating breakwaters were included in the searches for written material, but not in as much detail as buoys. Along with this reference material, a list of buoy manufacturers is included. The amount of papers and books written will multiply, but for the present, this is the only known working buoy reference library in existence.			
The subject is broken down into seven categories alphabetically filed. These are (1) mooring systems, (2) power sources, (3) development and design, (4) applications and uses, (5) instrumentation, math and computer models, (6) characteristics, and (7) miscellaneous. Two additional categories were made for fixed and floating breakwaters.			
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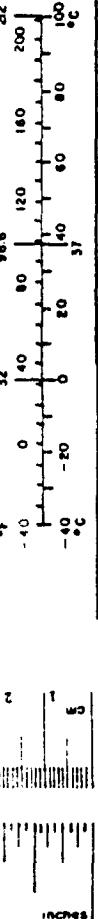
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## METRIC CONVERSION FACTORS

### Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol	When You Know	Multiply by	To Find	Symbol
<u>LENGTH</u>								
in	inches	12.6	centimeters	mm	mm	0.04	inches	in.
ft	feet	30	centimeters	cm	cm	0.4	inches	in.
yd	yards	0.9	metres	m	m	3.3	feet	ft
mi	miles	1.6	kilometres	km	km	1.1	yards	yd
<u>AREA</u>								
in <sup>2</sup>	square inches	0.5	square centimeters	cm <sup>2</sup>	cm <sup>2</sup>	0.16	square inches	in <sup>2</sup>
ft <sup>2</sup>	square feet	0.09	square meters	m <sup>2</sup>	m <sup>2</sup>	1.2	square yards	yd <sup>2</sup>
yd <sup>2</sup>	square yards	0.9	square meters	m <sup>2</sup>	m <sup>2</sup>	0.4	square miles	mi <sup>2</sup>
mi <sup>2</sup>	square miles	2.4	square kilometres	km <sup>2</sup>	km <sup>2</sup>	2.5	hectares (10,000 m <sup>2</sup> )	ha
<u>MASS (weight)</u>								
oz	ounces	28	grams	g	g	0.035	ounces	oz
lb	pounds	0.45	kilograms	kg	kg	2.2	pounds	lb
	short tons (2000 lb)	0.9	tonnes	t	t	1.1	short tons	sh. t.
<u>VOLUME</u>								
in <sup>3</sup>	inches	6	millilitres	ml	ml	0.03	fluid ounces	fl. oz.
Tbsp	tablespoons	15	millilitres	ml	ml	2.1	pints	pt
Tsp	fluid ounces	30	millilitres	ml	ml	1.06	quarts	qt
fl oz			litres	l	l	0.26	gallons	gal
C	cups	0.24	litres	l	l	36	cubic feet	cu. ft.
pt	pints	0.49	litres	l	l	1.3	cubic yards	cu. yd.
qt	quarts	0.98	litres	l	l			
gal	gallons	3.8	cubic metres	m <sup>3</sup>	m <sup>3</sup>			
yd <sup>3</sup>	cubic feet	0.93	cubic metres	m <sup>3</sup>	m <sup>3</sup>			
cu. yd	cubic yards	0.70	cubic metres	m <sup>3</sup>	m <sup>3</sup>			
<u>TEMPERATURE (exact)</u>								
°F	Fahrenheit	5/9 (after subtracting 32)	Celsius	°C	°C	9/5 (then add 32)	Fahrenheit temperature	°F
	°C		temperature					

\*In 1.25 (reciprocal). For other exact conversion and more detailed tables, see NBS Mon. Publ. 260, Units of Weights and Measures, Price 62.25, SD Catalog No. C13.10286.

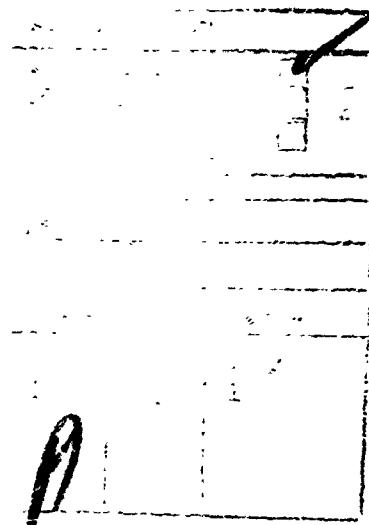


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Symbol	When You Know	Multiply by	To Find	Symbol	When You Know	Multiply by	To Find	Symbol
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cm	centimetres	0.4	inches	in.	m	3.3	feet	ft
m	metres	1.1	metres	m	km	1.1	yards	yd
km	kilometres	0.6	metres	m			miles	mi
<u>AREA</u>								
cm <sup>2</sup>	square centimetres	0.16	square inches	in <sup>2</sup>	m <sup>2</sup>	1.2	square yards	yd <sup>2</sup>
m <sup>2</sup>	square metres	1.2	square yards	yd <sup>2</sup>	ha	2.5	hectares	ha
ha	hectares	2.5	hectares	ha	km <sup>2</sup>	10,000 m <sup>2</sup>	square kilometres	km <sup>2</sup>
mi <sup>2</sup>	square miles	2.5	square miles	mi <sup>2</sup>				
<u>MASS (weight)</u>								
g	grams	0.035	ounces	oz	kg	2.2	pounds	lb
kg	kilograms	2.2	pounds	lb	t	1.1	short tons	sh. t.
t	tonnes	1.1	short tons	sh. t.				
<u>VOLUME</u>								
ml	millilitres	0.03	fluid ounces	fl. oz.	ml	2.1	pints	pt
l	litres	2.1	pints	pt	l	1.06	quarts	qt
l	litres	1.06	quarts	qt	l	0.26	gallons	gal
l	litres	0.26	gallons	gal	l	36	cubic feet	cu. ft.
m <sup>3</sup>	cubic metres	36	cubic feet	cu. ft.	m <sup>3</sup>	1.3	cubic yards	cu. yd.
m <sup>3</sup>	cubic metres	1.3	cubic yards	cu. yd.				
<u>TEMPERATURE (exact)</u>								
°C	Celsius	9/5 (then add 32)	Fahrenheit temperature	°F	°C	9/5 (then add 32)	Fahrenheit temperature	°F
	°F							

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